PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
686338C:MOB		
International Application No.	International Filing Date *(day/month/year)*	Priority Date *(day/month/year)*
PCT/AU2003/001688	18 December 2003	18 December 2002

International Patent Classification (IPC) or national classification and IPC

Int. Cl. [7] A61K 39/12, 39/125, A61P 35/00

Applicant

THE UNIVERSITY OF NEWCASTLE RESEARCH ASSOCIATES LIMITED et al

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   [X] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of **8** sheet(s).

3. This report contains indications relating to the following items:

   - I [X] Basis of the report
   - II [ ] Priority
   - III [ ] Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV [ ] Lack of unity of invention
   - V [X] Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI [ ] Certain documents cited
   - VII [ ] Certain defects in the international application
   - VIII [X] Certain observations on the international application

Date of submission of the demand	Date of completion of the report
12 July 2004	22 March 2005
Name and mailing address of the IPEA/AU	Authorized Officer
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	**M. Ong** Telephone No. (02) 6283 2491

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU2003/001688

Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed.

☒ the description, pages **1-13 ,16-36** as originally filed,
pages , filed with the demand,
pages **14,15** received on **4 March 2005** with the letter of **1 March 2005**

☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **37-42,** received on **4 March 2005** with the letter of **1 March 2005**

☒ the drawings, pages **1/19-19/19,** as originally filed,
pages , filed with the demand,
pages , received on with the letter of

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-63	YES
	Claims		NO
Inventive step (IS)	Claims	1-63	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-63	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1: Ferdat, AK et al
D2: WO 2001/037866
D3: Taguchi, F

Novelty (N): Claims 1-63

The invention is directed to the treatment of abnormal cells for example, cancerous cells, with an effective amount of an oncolytic virus selected from echoviruses and modified forms or combinations thereof, that recognises $\alpha_2\beta_1$ for the infectivity of the cells such that at least some of the cells are killed by the virus. The invention also encompasses the screening of abnormal cells for susceptibility to said virus and pharmaceutical compositions comprising the virus as an inoculant, together with a pharmaceutically acceptable carrier and the use thereof.

D1 teaches that the local administration of human echo-7 virus exerts an inhibitory effect on the growth of MX-17 tumour in BALB/c mice without signs of oncolysis. The document does not disclose nor suggest that at least some of the cells are killed by the virus.

D2 discloses a method of treating a malignancy for example, melanoma cells, with a virus that recognises a cell adhesion molecule and a complement regulatory protein, where the virus preferably is derived from the *Picornaviridae* family, e.g. coxsackievirus and echovirus. Specifically, the document discloses the use of echovirus type 7 (EV7) for infection of melanoma cells. However, the document does not disclose nor suggest that the virus recognise $\alpha_2\beta_1$ for the infectivity of the cells and eventual killing of the cells. It has been demonstrated by the applicant that EV7 infection involves the interaction of EV7 with the complementary regulatory protein, decay accelerating factor (DAF) not $\alpha_2\beta_1$.

D3 teaches the mass culture of viruses including echovirus that are used as inoculants for vaccines or antigens for diagnosis. However, it does not teach the killing of the abnormal cells. The document exemplifies only the preparation of smallpox vaccine liquor. Thus, it does not disclose all the essential features of the present invention.

Therefore the subject matter of these claims is new and meets the requirements of Article 33(2) PCT with regard to novelty.

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of

Inventive Step (IS): Claims 1-63

Claims 1-63 meet the criteria set out in PCT Article 33(3) with regard to the requirement of Inventive Step because the prior art does not obviously suggest to a person skilled in the art to treat abnormal cells with echoviruses and modified forms that recognises $\alpha_2\beta_1$ for the infectivity of the cells and such that at least some of the cells are killed by the virus. With respect to D3 the applicant has distinguished the teachings of said document on the basis of the physicochemical and biological differences between the small pox virus and echovirus. On the basis of this, it is considered that the skilled addressee would not be directly led to prepare a pharmaceutical composition of echovirus of the present invention.

Industrial Applicability (IA) Claims 1-63

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 58-62 do not fully describe the invention. The claims are directed to an applicator comprising a region that is impregnated with an inoculant consisting of echovirus, modified forms or a combination thereof, that recognises $\alpha_2\beta_1$ for the infectivity of the cells. However, it appears from the applicant's response that an essential feature of the invention is that the inoculant kills at least some of the cells. This feature is not defined in the claims.

Claim 58 is not clear in that there appears to be a typographical error in the phrase "impregnated with the inoculant **mammal**".